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UNITED STATES DEPARTMENT OF AGRICULTURE



In Cooperation with the
Agricultural Experiment Station, State College of Washington



DEPARTMENT BULLETIN No. 1236

Washington, D. C.

July 23, 1924

FARMING THE LOGGED-OFF UPLANDS IN WESTERN WASHINGTON

By

E. R. JOHNSON, Assistant Agricultural Economist

E. D. STRAIT, formerly Assistant Agricultural Economist,

Bureau of Agricultural Economics

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This study was planned to obtain information which would be helpful to farmers and prospective settlers on the logged-off uplands of western Washington on the following points:

1. Clearing of land; the clearing methods used, and the cost and advisability of clearing by different methods.
2. Organization and management of farms in this region, and the returns from the different types of farming.
3. Methods of increasing profits on farms already established.
4. Progress made by the settlers who have developed farms from logged-off lands.
5. Fundamental principles which prospective settlers should know before settling these lands and the practices which settlers should follow to develop a farm from logged-off land in the most economical and quickest manner.

A detailed study of farms established on logged-off land in King and Pierce Counties, Wash., was made in 1915 and again in 1921. Trained enumerators visited about 300 farmers in 1915 and about 400 in 1921 and obtained from each a record of his year's business, the financial progress he had made since settling on the farm, and other allied information. Practically every farmer visited in 1915

NOTE.—The department of farm management of the Washington State College of Agriculture assisted in planning the investigation and in collecting the data.

was revisited in 1921. While the conclusions drawn are strictly applicable to this area only, yet the general truths developed will apply almost as well to other heavily timbered areas in western Washington, Oregon, and British Columbia.

SUMMARY OF RESULTS.

In most cases the selling price of raw logged-off uplands plus the cost of the clearing exceeds the value of the land after it is cleared for crops.

It requires about 50 days of 8 hours of man labor, 34 days horse labor, 205 pounds of explosive costing \$36.39 in 1921, and caps and fuse costing \$4.26 to clear the average acre of stumps and roots, fill the holes, and level the land.

The proportion of settlers who had accumulated wealth to the extent of more than \$6,000 between the time of settlement and 1921 is as follows: 86 per cent of those who settled before 1898; 78 per cent of those who settled between 1898 and 1903; 61 per cent of the 1904 to 1909 settlers; 26 per cent of the 1910 to 1915 groups; and 5 per cent of those who settled during the six years previous to 1921.

Financial progress of the farmers has been determined largely by the quality of the land they occupy, its increase in value, the economy with which they have brought raw land to production, the persistency and intelligence which they have used in the operation of their farms, and their ability to adjust their standard of living to their incomes.

Poultry was the most important enterprise on the farms visited in 1921. On the average, 45 per cent of the total receipts came from poultry and eggs, 26 per cent from dairy products, and 15 per cent from fruit.

Feed was the largest item of cash expense in 1921, averaging 70 per cent of all expenses on the poultry farms, 47 per cent on the general farms, 39 per cent on the dairy farms, 21 per cent on the fruit farms, and 53 per cent for all the farms visited.

Poultry and small-fruit growing seem to be the most profitable types of farming for new settlers on the higher-priced uplands adjacent to the larger cities. In 1921, 48 per cent of the fruit, 44 per cent of the poultry, 22 per cent of the mixed, and 16 per cent of the dairy farms had farm incomes of \$500 or over.

The average farm income, that is, the difference between receipts and expenses for all farms in 1921, was \$414. In addition, the family had the use of food, shelter, and fuel furnished by the farm, amounting to \$316. In obtaining the farm incomes, unpaid family labor amounting to an average of \$166 was included in the expenses.

Many of the farmers in this region can increase their farm profits by increasing the size and quality of the farm business by keeping some accounts and studying the expenses and returns from their different enterprises, paying more attention to soil management and standardizing their farm products.

AREA STUDIED.

The territory surveyed was confined to the uplands of King and Pierce Counties. The topography ranges from nearly level to rolling, with steeper slopes descending into the larger valleys and becoming more rough and broken near the foothills. The soils are of glacial origin and mostly belong to the Everett gravelly sandy loam and

Everett loamy sand types. These soils are deficient in organic matter, subject to excessive drainage, and generally difficult to farm at a profit. One of the reasons for selecting this area was that most of the soils of the logged-off land of this region are of these types. (See fig. 1.)

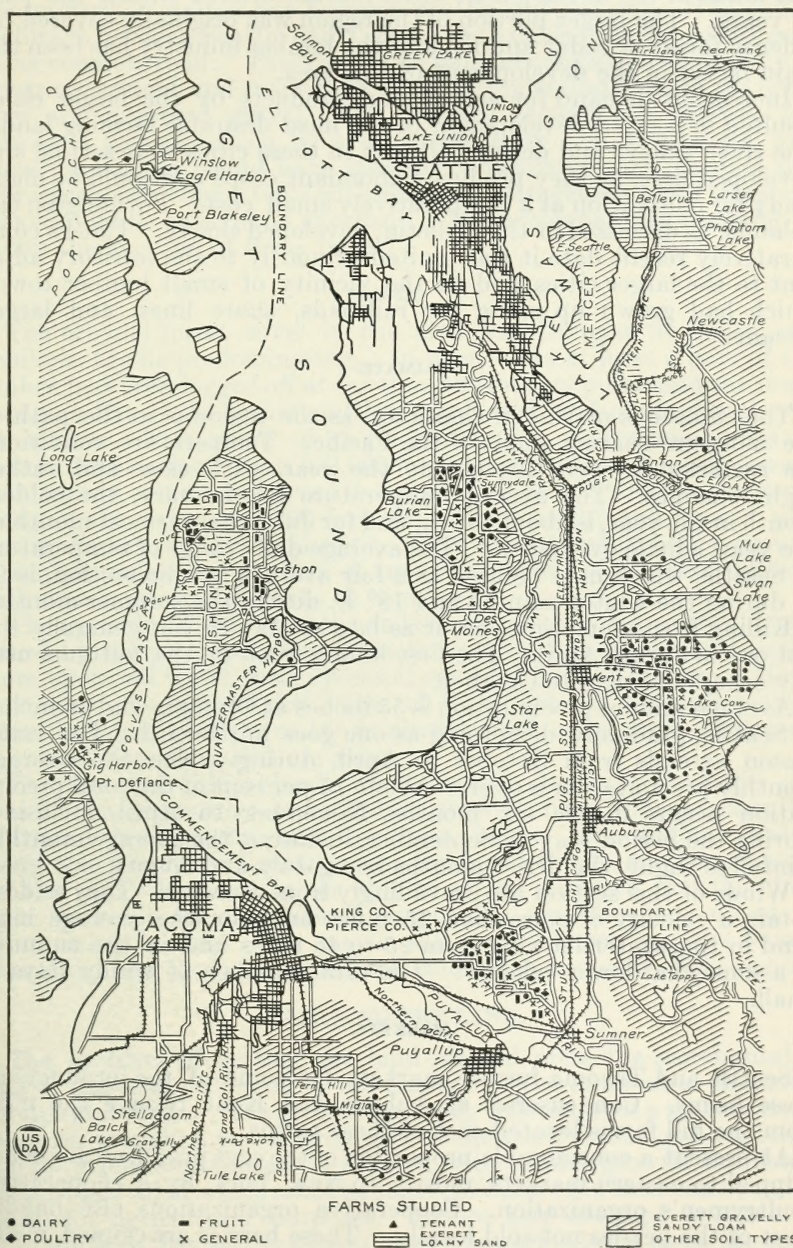


FIG. 1.—Most of the farms studied for this report are served by good public roads, steam and electric railways, or boat lines, radiating from the principal seaport towns.

HISTORY OF AGRICULTURAL DEVELOPMENT.

Looking back into the early history of this region, one finds that the settlement of the Puget Sound Basin began in the decade 1850-1860, but the population increased very slowly and little progress was made in the development of its resources until within the past 40 years. The larger portion of the region was originally covered by a dense forest of cedar and fir, and the lumber industry has been the main factor in the development of this area.

Increasing demand for agricultural products by the larger cities resulted in a rapid development of the most desirable farming lands. The river valleys and deltas adjacent to these cities were settled and developed first, as they produced abundant crops and could be made ready for cultivation at a comparatively small cost. Farming on the uplands, as discussed in this bulletin, developed slowly. Until a comparatively recent date it was limited primarily to the territory adjacent to the larger cities and in the vicinity of small lumber towns which had grown up along the railroads, shore lines, and larger streams.

CLIMATE.

The climate is marine in character, as the region is in the path of the moisture-bearing winds of the Pacific. Temperature conditions are remarkably even throughout the year, with slow and rather slight changes. The average temperature for January, the coldest month in the year, is about 40° F., and for July, the warmest month of the year, a little over 60° F. The average daily range of temperature at Seattle, which may be used as a fair average for the section, is 9° F. during the winter months and 18° F. during the summer months.

Killing frosts sometimes occur as late as May 15, but generally the last one is during April. The first killing frost in the autumn usually occurs during late October.

Average annual precipitation is 55 inches at Olympia and 35 inches at Seattle, gradually decreasing as one goes northward. The rainy season extends from October to April, during which the average monthly precipitation is over. About 75 per cent of the total precipitation occurs in the six months, November to April, inclusive. During the period May to September, inclusive, the average monthly rainfall is slight, the driest months being July and August.

Winds of this section are prevailing from the west. They seldom obtain a velocity of more than 45 miles an hour, the average high wind in the winter blowing from 25 to 45 miles and in the summer at a somewhat lower velocity. The total number of windy days is small.

MARKETS.

Seattle and Tacoma furnish markets for some of the products of these farms. Condenseries at Auburn and Kent receive the milk from the hill farms located east of these towns.

At present a considerable proportion of the eggs produced are being shipped to eastern markets, mostly to New York, by a cooperative poultrymen's organization. Cooperative organizations also handle most of the berries not sold locally. These berries are canned, made into preserves, or shipped as fresh fruits.

TRANSPORTATION.

Most of the farms studied are located east of Kent, which is on the main line of the Northern Pacific, Great Northern, Oregon-Washington Railroad & Navigation Co., Chicago, Milwaukee & St. Paul, and the interurban electric line between Seattle and Tacoma. The valley highways between Seattle and Tacoma are excellent, much of the way being concrete road. There are some miles of concrete road directly in the areas studied, and practically all of the remaining roads in the territory are improved gravel. The farmers around Gig Harbor are furnished transportation by a municipal ferry line to Tacoma, and those on Vashon Island have steamer connections with Tacoma and municipal ferry connections with Seattle. Altogether, local transportation could be considered excellent. The accompanying map (fig. 1) shows the location of these farms.

TIMBER.

The original forest cover in the area was Douglas fir, cedar, and hemlock, the fir predominating. In most cases at least a part of the timber had been logged off at the time the settlers purchased the land, though a few of the earliest settlers purchased land covered with virgin timber. This stand of virgin timber was exceptionally heavy. Stands running more than 100,000 feet per acre were not at all uncommon, and in some small areas it ran as high as 300,000 feet per acre. Many of the trees were 200 feet or more in height and from 4 to 8 feet in diameter at stump height. This exceptionally heavy growth of timber makes the problem of land clearing one of the most difficult with which the settlers have to contend.

The agricultural worth of the soils in this area is not readily determined by the plant covering, since the distribution of plants depends more upon soil water than upon soil composition and texture. However, since the agricultural value of these uplands depends largely upon the capacity of the soil to retain moisture, some suggestions may be gained from the plant covering.

The less desirable uplands, those having excessive drainage, are usually conspicuous by an abundant growth of madrona, manzanita, evergreen huckleberry, and mountain balm. The original timber stand was also much lighter and is indicated by the smaller stumps. On the soils which are better able to retain moisture, and therefore more desirable for agricultural purposes, a considerable amount of alder, cedar, hemlock, vine maple, salal, and Oregon grape is found. The "alder bottoms" are considered among the best soils of the region.

CLEARING THE LAND.

The problem of getting the land cleared after the merchantable timber has been taken off is not limited to the removal of the large stumps and snags. The ground is usually littered with a mass of dead tops and branches, and a large part of the land which has been lying idle for a number of years is covered with second growth and dense underbrush, all of which must be removed before the land can be made useful for agricultural purposes. Before any attempt is made to clear the land, the settler should have some knowledge as to the agricultural value of the soil.

In clearing the land for agricultural purposes, it is first slashed then pastured for several years, during which time many of the logs and some of the stumps are removed. (See figs. 2 and 3.) From two to six days are required to slash an acre. The slashing had best be done in the summer. Care should be exercised to fall the slash so that a good burn may be obtained. As soon as the slash is dry, it should be burned.

Before burning a permit must be obtained from the fire warden and precaution taken to prevent the fire from getting beyond control.

If the land is to be used for pasture, clover and grass seed should be sown in the ashes and scratched in before the fall rains. At the time of seeding a large amount of small stuff can be picked up and long logs that would seriously interfere with the grazing cattle may be burned into shorter lengths.

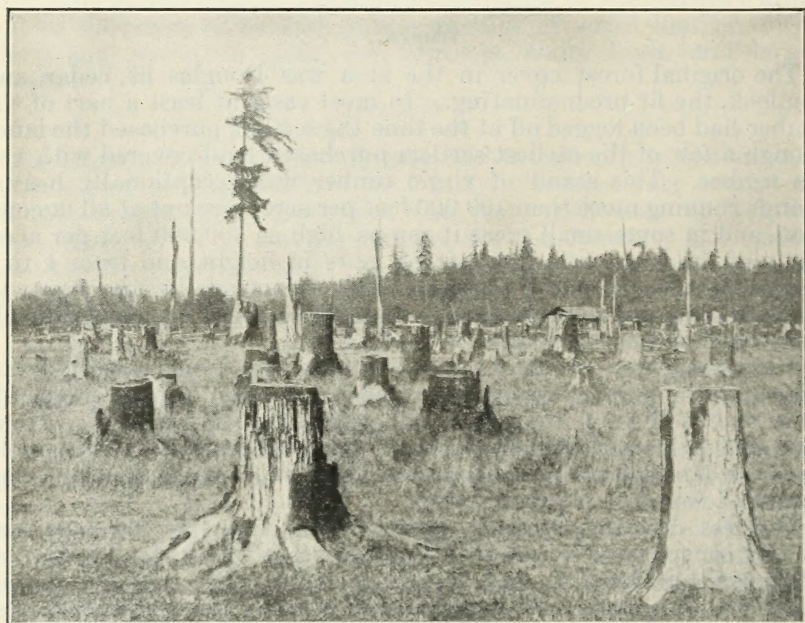


FIG. 2.—Fir stumps ranging from 3 to 6 feet in diameter. They are about 8 feet in height. In many cases the larger stumps are allowed to remain for several years and crops are grown between.

After seeding, the land is usually pastured for a few years, and during this period most of the logs are hauled together and burned. Some may be used for fuel for domestic purposes, and if any burning method is to be used in removing the stumps, a number will be needed for fuel to assist in burning.

The time required to haul the logs into piles depends on many factors, such as amount of waste left from logging and fuel requirements for the home and for burning stumps, but on the average it takes a crew of two or three men, with two horses and blocks and line, from 4 to 10 days per acre.

There has been a great variation in stumping practices. Table 1 shows the number of farmers using different methods in 1915 and 1921.

TABLE 1.—*Stumping practices in uplands of western Washington.*

Method.	Number of farmers using methods in—	
	1915	1921
Boring and burning.....	37	6
Horsepower capstan and explosive.....	35	15
Explosives and burn in ground.....	26	9
Blocks and line and explosive.....	24	23
Donkey engine.....	6	1

A few farmers have cleared by the use of donkey engines. This method requires a large cash outlay, but land can be cleared more rapidly than by any other method.

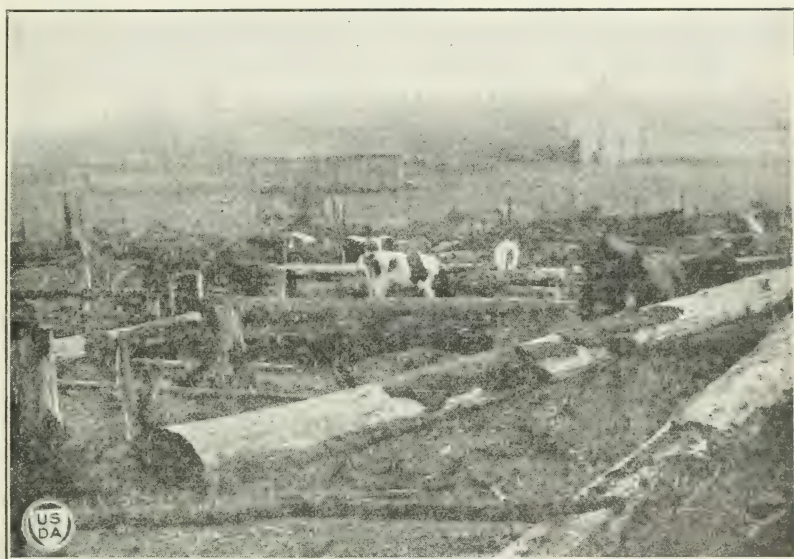


FIG. 3.—Early utilization of land for pasture. The young growth has been slashed and burned and enough small stuff picked up to allow stock to graze. Grass seed was sown in the ashes immediately after burning.

When dynamite is used, some use an amount sufficient to shoot the stump clear of the ground. Others use enough to crack the stump and then burn it in the ground. Others use a little more explosive, breaking the stump into smaller pieces and later pulling them with a horsepower capstan puller or with blocks and line. The use of blocks and line in connection with explosive is increasing.

Where possible to use, one of the best and cheapest methods of destroying the stumps is by the char-pit method, but unfortunately soil in this area does not contain enough clay to permit its use.

Burning methods are extensively used, particularly by those who have little cash and plenty of time. Some bore intersecting holes into the heart of the stump and fire at the point of intersection; others dig the earth from around the roots and fire. Aside from the time consumed, the other objection to all burning methods is that there is

a tendency to leave unburned roots close to the surface. One method of burning is described in Bulletin 195 of the Oregon State College of Agriculture. Prospective purchasers of farms should satisfy themselves that the cleared land is free from all roots to below plow depth.

Accurate data were obtained on the time and money required to remove the stumps from 25 tracts between October 1, 1920, and October, 1921.

The size of these tracts varied from 0.5 to 8 acres, with an average of 1.9 acres. All had been slashed, burned, and seeded. Practically all the logs and small stumps had been previously removed and the land had been pastured several years.

The stumps were fir, averaged 24 per acre, and ranged from 2 to 7 feet in diameter where cut. Explosive was used to break the stump into pieces that could be handled with a team or horse with blocks and line. In some cases a stump puller was used on stumps that could not be well handled by the use of blocks and line.

It required 50 eight-hour days of man labor, 34 days of horse labor, 205 pounds of explosive costing \$36.39 and caps and fuse costing \$4.26 to clear the average acre of stumps and roots, fill the holes, and level the land. Most of the work on these clearing operations was done by the operator and his family, so the cash cost of clearing seldom exceeded \$50 to \$75 per acre. At \$3 per day for man labor, \$1 per day for horse labor, and \$4 per acre for use of equipment, the cost of clearing would have been \$228 per acre. The same year the contract price for similar clearing operations was from \$225 to \$250 per acre.

THE ORGANIZATION AND MANAGEMENT OF FARMS IN THE AREA.

A complete record of the business of 157 farms for 1915 and of 150 farms for 1921 was obtained from their operators. (See Table 2.)

TABLE 2.—*Distribution of farm area on 157 farms in 1915 and 150 farms in 1921.*

1915.

Type of farming.	Number of farms.	Average acres per farm.		Average acres in crops.				
		Total.	Cleared.	Total.	Hay.	Potatoes.	Fruit.	Other crops.
Dairy	79	47.1	17.2	14.1	11.8	0.5	0.9	0.9
Poultry	55	17.1	7.2	5.5	2.9	.3	1.7	.6
Fruit	12	16.0	10.5	9.7	2.4	.1	7.0	.2
Mixed	11	24.4	11.2	9.9	4.4	.8	4.0	.7
All farms.....	157	32.6	12.8	10.5	7.5	.4	1.9	.7

1921.

Dairy	57	43.7	19.7	15.7	13.1	0.4	1.0	1.2
Poultry	43	13.5	8.6	5.7	2.3	.4	2.0	1.0
Fruit	27	16.7	9.3	8.1	2.0	.4	5.3	.4
Mixed	23	34.0	13.0	11.1	7.4	1.0	1.3	1.4
All farms.....	150	28.7	13.6	10.8	7.1	.5	2.1	1.1

The average size of the 157 farms in 1915 was 32.6 acres, with 12.8 acres cleared; of the 150 farms in 1921 it was 28.7 acres with 13.6 acres cleared. Compared with other farms in logged-off land sections throughout the United States, these farms are small. Among

the reasons for this condition are (1) the high price of the land, due partly to the proximity of large seaport cities, partly to the limited amount of available land suitable for farming and partly to the great demand for land in this section by people who have been attracted to the locality by the climate and scenery; (2) the difficulty of clearing, the cost of which in many cases exceeds the purchase price of the land; and (3) the widely current idea that a small farm is ideal.

It is not surprising, therefore, to find that the types of farming in this area are mostly of an intensive nature. They divide easily into four groups: Dairying, poultry raising, fruit growing, and mixed farming, the latter representing those farms in which the various enterprises are small and no one is of outstanding importance. Table 3 shows the size of farm which seems to have been most conducive to the development of the different types. In 1921 none of the farms with 5 acres or less of cleared land were dairy farms, while of the poultry and fruit farms, only 1 had more than 25 acres of cleared land. Judging from the number of farms represented in both years farms with 5 acres or less of cleared land are slightly better adapted to poultry raising, those with 6 to 15 acres to fruit and mixed farming, and those with larger areas to dairying.

TABLE 3.—*Relation of type of farming to area of cleared land, 157 farms in 1915 and 150 farms in 1921.*

	Number of farms.	Number of farms with specified amounts of cleared land.				Average acres of cleared land per farm.
		5 acres and less.	6 to 15 acres.	16 to 25 acres.	26 acres and over.	
Dairy	79	4	35	28	12	17.2
Poultry	55	25	27	2	1	7.2
Fruit	12	3	6	3	0	10.5
Mixed	11	3	5	3	0	11.2
All farms	157	35	73	36	13	12.8

1921.						
Dairy	57	0	19	30	8	19.7
Poultry	43	20	17	5	1	8.6
Fruit	27	5	17	5	0	9.3
Mixed	23	4	13	5	1	13.0
All farms	150	29	66	45	10	13.6

CAPITAL INVESTED.

Comparison of the farm capital in different groups is shown in Table 4. The dairymen and those following a mixed type of farming have the largest amount invested in land because they have the largest farms. The poultry and fruit farms show the greatest value of real estate per acre, largely because they are near the cities. The largest amount of working capital¹ is required on the dairy and poultry farms and the smallest amount on the fruit farms. The larger portion of the working capital is in form of productive livestock—cows and poultry.

¹“Working capital” is that portion of the capital invested in livestock, machinery, feed, and cash to run the farm.

TABLE 4.—Average distribution of farm capital on 157 farms in 1915 and 150 in 1921.

1915.

	Real estate.		Working capital.			
	Total.	Per acre.	Total.	Machin- ery and work stock.	Other live- stock.	Other working capital.
Dairy	\$7,469	\$159	\$1,316	\$348	\$734	\$234
Poultry	4,908	287	779	233	433	113
Fruit	6,104	382	516	235	146	135
Mixed	6,914	283	580	192	300	88
All farms	6,429	197	1,015	287	554	174

1921.

Dairy	9,837	225	1,597	436	734	427
Poultry	7,470	551	1,596	401	1,006	189
Fruit	6,916	413	490	207	191	92
Mixed	8,548	252	1,198	376	562	260
All farms	8,435	294	1,336	375	688	273

LIVESTOCK.

Chickens and dairy cows are the most important livestock on these farms. Ninety-five per cent of the farmers, both in 1915 and 1921, kept chickens. There was an average of 223 hens per flock in 1915, and 298 in 1921. Cows were kept on 93 per cent of the farms in 1915 and on 88 per cent in 1921, the average for these farms being 5.2 head in each year. On the farms having young cattle, there was an average of 3.7 head per farm in 1915 and 2.5 in 1921.

The dairy farms in 1915 averaged 7.9 cows per farm. This was increased slightly, to 8.7 cows, in 1921. On the average, very few hens were kept on the dairy farms, there being only 55 hens per farm in 1915 and 43 in 1921.

On the average poultry farm the flock was increased from 458 hens at the beginning of the 1915 farm year to 697 in 1921. Dairy cows were comparatively unimportant on these farms. There was an average of less than 2 cows per farm in both years.

Work stock was kept upon 90 per cent of the farms in 1915 and 86 per cent in 1921, with an average of 1.6 head on the farms with work stock in both years.

Hogs were kept on less than half the farms, and on these farms there was an average of only 4.2 head in 1915 and 2.9 in 1921. Hogs were sold from only 29 per cent of the farms in 1915 and 19 per cent in 1921. The fact that all grain must be purchased and the absence of skimmed milk make the raising of hogs for market unprofitable.

CROPS.

Hay occupies a greater acreage than any other crop on all except the fruit farms. It is practically all fed on the farm, many of the dairy farms buying additional hay. About 83 per cent of the crop area of the dairy farms was in hay in 1915 and 1921 and for all farms average 71.4 per cent and 65.7 per cent, respectively, for the same

two years. Hay is made from timothy, clover, and grain, which is usually oats. Oats are grown for hay only and are principally used as a nurse crop for clover and timothy. On account of the heavy dews and occasional rains during the harvest, the hay is usually somewhat inferior in feeding qualities to that imported from drier areas.



FIG. 4.—A typical planting of strawberries. The value of the strawberry crop exceeds that of any other small fruit in the area. In 1921, 39.2 per cent of the farm receipts on the fruit farms came from this crop.

Potatoes are grown almost entirely for home use. The yield is usually low. (See Table 5.) A few farmers living on the lighter soils have increased their incomes considerably by growing potatoes for the early market.

TABLE 5.—Average yields of principal field crops.

Crop.	1915		1921	
	Number of farms reporting.	Average yield per acre.	Number of farms reporting.	Average yield per acre.
Hay, timothy, and clover.....	116	2 tons.....	101	2.9 tons.
Other hay.....	110	2.4 tons.....	100	2.1 tons.
Potatoes.....	114	159 bushels....	148	160 bushels.

Production of small fruits is increasing. Strawberries are the most important small-fruit crop, **with** raspberries and Logan blackberries gaining in importance upon soils which do not dry out too early in the season. (See fig. 4.) Logan blackberries seem to be particularly adapted to the climatic conditions of western Oregon and Washington, and, as yet, have not been grown with success in other sections of the country. The future commercial importance of this crop may have some bearing on the development of the logged-off lands in western Washington and Oregon, to which the crop is best adapted. Blackberries require a moist soil and therefore are not extensively grown on the uplands. Currants and gooseberries do well on the drier soils, but as yet have not been generally grown for commercial purposes.

The yields as given in Table 6 are the averages for the farms included in the investigation of the amount of fruit harvested on bearing acreage. No account was taken of the loss caused by waste and spoilage in the field. The yields, especially of blackberries and raspberries, are considerably less than in lower and more favorable areas.

The "other crops" consist of orchard fruits and vegetables for livestock (kale, mangels, and carrots) which have little commercial significance.

TABLE 6.—*Average yields of berries, 1921.*

Kind.	Number of farms reporting.	Average yield per acre.	
		Crates.	Pounds.
Strawberries.....	45	348	5,742
Raspberries.....	24	234	3,861
Logan blackberries.....	8	251	4,267
Blackberries.....	7	242	4,598

TENURE.

The facts that most of the farms are small and many of the farms are looked upon primarily as homes, tend to discourage the growth of tenancy in this area. More small-fruit farms are rented than farms of the other types. A few of these farms are rented to Japanese farmers, who generally devote the entire cleared area to strawberry growing. In practically all cases rent is paid in cash.

On account of the small number of tenant farms in this area, all of the farms are analyzed only on the farm basis.

RECEIPTS FROM FARMS OF THE DIFFERENT TYPES.

The principal sources of receipts in 1915 and 1921 on the farms of different types are shown in Table 7 and Figure 5.

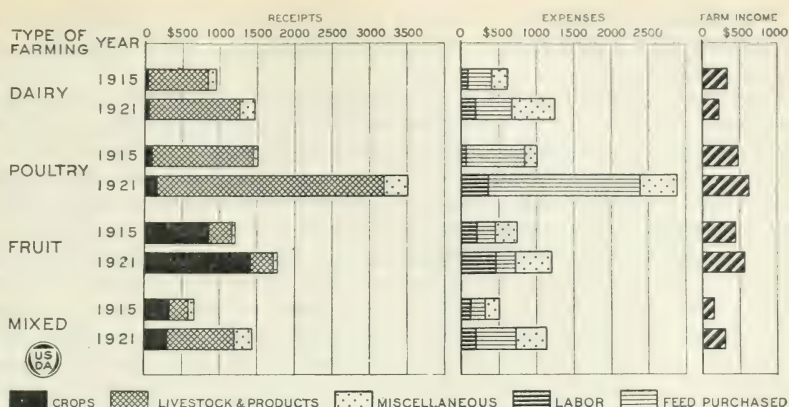


FIG. 5.—The poultry and fruit farms showed the greatest returns on most of these upland farms. Combining small fruit growing with poultry farming is gaining much favor among the hill farmers in this area.

TABLE 7.—Distribution of farm receipts on farms of different types.

	1915					1921				
	All farms.	Dairy.	Poultry.	Fruit.	Mixed.	All farms.	Dairy.	Poultry.	Fruit.	Mixed.
Number of farms.....	157	79	55	12	11	150	57	43	27	23
Total receipts per farm.....	\$1,148	\$959	\$1,510	\$1,197	\$662	\$2,110	\$1,480	\$3,517	\$1,774	\$1,441
Receipts from:—										
Hay.....	3	4	3	(1)	1	2	1	4	3	1
Potatoes.....	14	12	11	4	60	39	20	25	35	118
Fruit.....	125	27	78	847	275	311	39	121	1,334	141
Other crops.....	6	5	8	6	(1)	20	.....	12	48	49
Total crops.....	148	48	100	857	336	372	60	162	1,420	309
Cattle and dairy products ²	385	677	92	61	111	552	1,124	78	129	519
Poultry and eggs.....	510	102	1,238	240	86	964	91	2,966	171	313
Other livestock.....	24	22	24	9	54	10	(1)	.....	6	62
Total livestock.....	919	801	1,354	310	251	1,526	1,215	3,044	306	894
Outside labor.....	58	81	32	24	70	130	157	118	37	194
Wood from farm.....	12	20	5	.....	2	29	44	13	6	44
Other miscellaneous ³	11	9	19	6	3	53	4	180	5	(1)
Total miscellaneous....	81	110	56	30	75	212	205	311	48	238

¹ Less than \$1.

² Milk receipts are net of hauling in 1915; gross in 1921.

³ Includes increase in feed and supplies.

From the standpoint of receipts, poultry raising is the most important enterprise, returning approximately 45 per cent of the total receipts of all farms for both years. Dairying is second, with 33.5 per cent of all receipts in 1915 and 26.1 per cent in 1921; fruit growing third, with 10.9 per cent and 14.7 per cent for the same years.

The receipts from crops (including fruit) amounted to only 12.9 per cent of the total in 1915 and 17.6 per cent in 1921. This low proportion is accounted for by the fact that the dairy and poultry farms are more numerous than farms of the other types and most of the receipts on these farms are from livestock and livestock products.

Receipts from livestock and livestock products amounted to 80 per cent of the total in 1915 and 72 per cent in 1921.

Miscellaneous receipts, of which outside labor is the largest item, amounted to 7.1 per cent of the total receipts in 1915 and 10.1 per cent in 1921.

Practically three-fourths of the receipts of the dairy farms are from the dairy, 70.6 per cent in 1915 and 75.9 per cent in 1921. Outside labor is next, with 8.5 per cent of the total receipts in 1915 and 10.6 per cent in 1921, and poultry third, with 10.6 and 6.2 per cent, respectively, for the same years. In 1915, 82 per cent of the receipts of the poultry farms were from poultry. This was increased by 2.3 per cent in 1921, principally on account of larger flocks. The importance of dairying and fruit growing on the poultry farms was less in 1921, the former decreasing from 6.1 percent to 2.2 percent of the total receipts.

On the fruit farms in 1921, 75.2 per cent of the total receipts were from fruits, 39.2 per cent from strawberries alone. In 1915 strawberry receipts alone amounted to 55.6 per cent of all farm receipts. Poultry is of considerable importance on the fruit farms, contributing 20 per cent of the total receipts in 1915 and 9.6 per cent in 1921. Cattle and dairy products amounted to 5.1 per cent and 7.3 per cent of the total receipts for the same years.

The distribution of enterprises on the mixed farms in 1921 was much more desirable and profitable than in 1915, as will be seen in the discussion of incomes on these farms. (See p. 15.) The operators of these farms derive a large proportion of their incomes from outside work.

On all types of farms, except fruit farms and mixed farms for 1915, the receipts from livestock and livestock products far outweigh the crop and all other receipts combined, but a large amount of hay and all the grain fed are purchased.

EXPENSES ON FARMS OF DIFFERENT TYPES.

Table 8 and Figure 5 show the distribution of the principal items of expense on the farms of different types. Feed was the largest item of expense, except on the fruit farms in 1921. Expense for feed ranged from 21.1 per cent of all expenses on the fruit farms in 1921 to 76.7 per cent on the poultry farms in 1915.

TABLE 8.—*Distribution of farm expenses on farms of different types.*

	1915					1921				
	All farms.	Dairy.	Poultry.	Fruit.	Mixed.	All farms.	Dairy.	Poultry.	Fruit.	Mixed.
Number of farms.....	157	79	55	12	11	150	57	43	27	23
Total expense per farm.....	\$762	\$624	\$1,021	\$743	\$502	\$1,696	\$1,252	\$2,891	\$1,212	\$1,136
Expense for—										
Hired labor.....	53	45	51	138	37	128	44	146	341	56
Family labor.....	42	49	16	70	95	166	155	218	131	138
Repairs and depreciation of machinery and buildings.....	70	72	73	57	54	117	122	151	75	93
Feed bought.....	461	314	783	242	190	893	483	2,029	256	529
Taxes (real estate and personal).....	52	67	31	50	57	104	147	68	66	108
Auto for farm use.....						81	65	122	71	55
Milk hauling.....						48	101	6	9	42
Crates and containers.....	13	2	10	82	24	45	5	19	193	20
All other items.....	68	75	57	104	45	114	130	132	70	95
Per cent of receipts required to meet all expenses.....	66.4	65.1	67.6	62.1	75.8	80.4	81.6	82.2	68.3	78.8
Per cent of receipts required to meet expenses for feed....	40.4	32.7	51.9	20.2	28.7	42.3	32.6	57.7	14.4	36.7

Hired labor was the next largest item of cash expense. It averaged 7 per cent of the total expenses on all farms in 1915 and 7.5 per cent in 1921, being lowest on the dairy farms and highest on the fruit farms. This item amounted to 3.5 per cent of the total expenses on the dairy farms in 1921 and 28.1 per cent on the fruit farms in the same year. The berry farms require considerable help through the picking season on account of the perishability of the fruit, when from 6 to 10 pickers are required per acre for strawberries and blackberries; from 5 to 7 per acre for raspberries and Logan blackberries, and from 3 to 5 per acre for currants and gooseberries. Usually very little difficulty is encountered in getting pickers from the vicinity or near-by towns.

Taxes represent the third largest item of the cash expenses on all farms. This expense was greatest on the dairy and mixed farms, and amounted to 6.8 per cent of the total expenses on all farms in 1915 and 6.1 per cent in 1921.

EARNINGS ON FARMS OF DIFFERENT TYPES.

The earnings of these farms have been rather low. (See Tables 9 and 10.) Farm incomes averaged less than \$500 in each year, with the poultry and fruit farms showing the higher averages. These comparatively low earnings are not unusual for the majority of farms in the heavily timbered sections throughout the country. A further analysis of the farm earnings on these farms is shown in Table 10.

TABLE 9.—*Earnings of farms of different types.*

	1915					1921				
	All farms.	Dairy.	Poultry.	Fruit.	Mixed.	All farms.	Dairy.	Poultry.	Fruit.	Mixed.
Farm income.....	\$386	\$335	\$489	\$454	\$160	\$414	\$225	\$626	\$562	\$305
Interest on farm capital at 7 per cent.....	521	615	398	463	525	684	800	635	518	682
Labor income.....	-135	-280	91	-9	-365	-270	-572	-9	44	-377
Per cent return on capital.....	0.1	-0.3	1.3	1.1	-1.7	-2.0	-3.6	0.6	4.0	-2.5
Farm family income.....	\$428	\$384	\$505	\$524	\$235	\$580	\$383	\$844	\$693	\$443
Family living from the farm.....						316	314	339	273	325

NOTE.—Farm income is the difference between farm receipts and farm expenses.

Labor income is the amount left after 7 per cent interest on the farm capital is deducted from the farm income.

Per cent return on capital is the rate returned on the farm capital after the value of the farmer's labor is deducted from the farm income.

Farm family income is the farm income plus the value of unpaid family labor.

Family living from the farm represents the meat, milk, eggs, fruit, vegetables, etc., set aside from the farm production for family use and the fuel and house rent furnished by the farm.

TABLE 10.—*Relation of type of farming to farm income, 1921.*

Type of farming.	Number of farms with specified farm incomes.				
	Less than \$0. ¹	\$0 to \$499.	\$500 to \$999	\$1,000 to \$1,499.	\$1500 and over.
Dairy.....	16	32	8	1	
Poultry.....	8	16	11	2	6
Fruit.....		14	9	2	2
Mixed.....	6	12	4	1	
All farms.....	30	74	32	6	8

¹ Expenses greater than receipts.

The tendency for the farmers of a community, particularly those who are in debt for their land, to approach the type of farm organization which yields the greatest returns on the capital invested is clearly brought out in the study of these farms. In 1921 there were mortgages on 37 per cent of the 70 poultry and fruit farms and on only 22 per cent of the 80 dairy and mixed farms. As shown in Table 11, 40 per cent of the poultry and fruit farms included in the study were settled after 1915 and only 16 per cent of the dairy and mixed farms. In other words, the majority of the recent settlers who assumed large mortgages on their farms when they settled are following the types of farming which pay the highest return for the capital invested.

If there had been no debts or interest to pay, the average farmer in 1921 would have had in addition to the farm income (\$414) the value of unpaid labor, which amounted to \$166, and the value of the food, shelter, and fuel furnished by the farm, which amounted to \$316.

TABLE 11.—*Types of farming followed in 1921 by farmers who settled at different periods.*

Type of farming.	Date of settlement.					
	Before 1898.	1898-1903	1904-1909	1910-1915	1916-1921	Total in 1921.
Dairy	9	18	11	9	10	57
Poultry	1	2	9	9	22	43
Fruit	3	3	6	8	7	27
Mixed	4	5	7	4	3	23
All farms	17	28	33	30	42	150

PRICES RECEIVED FOR FARM PRODUCTS.

Prices received by farmers for their products have perhaps as great an influence as any other single factor upon their profits. The period covered by this survey was disturbed somewhat by the fall in prices, the dairymen suffering more, apparently, than the poultrymen.

The average farm price by months and the relation of the total production to receipts from milk and eggs on 36 dairy and 35 poultry farms in 1921 are shown in Table 12. The maximum production on the dairy farms occurred from April to July, inclusive, when approximately 42 per cent of the total amount of milk was produced. This netted about 36 per cent of the total milk receipts for the year. The greatest production on the poultry farms occurred during March, April, and May, when 31.6 per cent of the eggs were produced, which amounted to 20.6 per cent of the yearly egg receipts.

In view of the facts that the 10-year average price of eggs (1913-1922), as determined by the Division of Crop and Livestock Estimates, was highest between November and February, inclusive, and that poultry production has developed to such a high degree of perfection in this section, it seems that greater profits would result if more emphasis were placed upon egg production during this period. However, considerable caution must be exercised in forcing the birds for fall and winter production. Too heavy forcing may destroy the power of the birds to recuperate before the normal heavy egg-laying period during the spring.

The average farm price of the 1921 potato crop was \$1.32 per 100 pounds. A large part of the crop was marketed during the late summer and early fall.

Strawberries sold for an average of \$1.01 per crate; raspberries, \$1.65; Logan blackberries, \$1.22; blackberries, \$1.23. These prices are net of crates and include both canners and shippers, the crates averaging from 17 to 20 pounds net.

TABLE 12.—*Monthly farm price of milk and eggs and distribution of production and receipts on 36 dairy and 35 poultry farms, 1921.*

Month.	Milk.			Eggs.		
	Price per 100 pounds.	Production (per cent of total).	Receipts (per cent of total).	Price per dozen.	Production (per cent of total).	Receipts (per cent of total).
1920.						
October.....	\$2.23	7.0	9.2	\$0.67	4.2	7.8
November.....	1.99	6.6	7.8	.67	7.4	13.9
December.....	1.84	7.2	7.8	.52	9.4	13.8
1921.						
January.....	1.65	7.5	7.3	.46	9.0	11.7
February.....	1.78	7.1	7.5	.32	8.7	7.5
March.....	2.17	7.5	9.6	.28	10.0	7.6
April.....	1.95	9.3	10.6	.24	10.6	7.0
May.....	1.44	11.3	9.6	.19	11.0	6.0
June.....	1.22	11.6	8.3	.21	9.5	5.7
July.....	1.29	9.7	7.4	.32	7.9	7.0
August.....	1.52	7.7	6.9	.34	7.0	6.6
September.....	1.80	7.5	8.0	.37	5.3	5.4

CHANGES BETWEEN 1915 AND 1921 ON 47 FARMS.

Changes which have been made in the organization of a group of representative farms operated by the same men through a period of years throw light on the progress of a new agricultural region.

Analysis of the business of each of 47 such farms in this region in 1915 and also in 1921 shows (Table 13) no rapid expansion in size of the farm business except for the poultry farms. There was an increase of only 2.3 acres per farm by clearing. Only 0.6 acre was added to the crop area in six years; half of this was for small fruits. There was practically no increase in the average number of cows per farm, and only 19 more chickens per farm in 1921 than in 1915. The poultry farms increased the size of their flocks from 780 to 1,038 in six years. The dairy farms had an average of 8 cows in both years.

The increase in real estate value from \$194 to \$287 per acre is significant. This is due partly to the general rise in land values, partly to the increase in tillable area per farm, and partly to the building improvements added, amounting to an average of \$561 per farm.²

Dairying was still the principal type of farming in 1921 on these 47 farms, as shown in Table 14.

TABLE 13.—Summary of the business of 47 farms operated by the same owners, 1915 and 1921.

	1915	1921		1915	1921
Acres in farm.....	37.2	35.2	Receipts—Continued.		
Acres cleared.....	15.1	17.4	Outside labor.....	\$78	\$149
Acres in crops.....	13.5	14.1	All other.....	19	16
Acres in—					
Hay.....	10.1	10.0	Expenses, total.....	762	1,158
Potatoes.....	.5	.6			
Berries.....	.5	.8	Hired labor.....	62	92
Other crops.....	2.4	2.7	Family labor.....	63	198
Number of cows.....	6.2	6.5	Repairs and depreciation on machinery and buildings.....	71	120
Number of hens.....	149.0	168.0	Feed bought.....	403	743
Number of work stock.....	1.7	1.6	Taxes.....	63	134
Total capital.....	\$8,381	\$11,558	All other.....	100	271
Land without buildings.....	6,002	8,120	Farm income.....	\$395	\$290
Buildings.....	1,227	1,999	Interest on capital at 7 per cent.....	\$586	\$809
Working capital.....	1,152	1,439	Labor income.....	—\$191	—\$519
Receipts, total.....	1,157	1,848	Value of operator's labor and management.....	\$386	\$607
			Per cent return on capital.....	0.1	—2.7
Berries.....	113	222	Family farm income ¹	\$458	\$488
Other fruit.....	58	73	Family living from farm.....	(²)	\$341
Potatoes.....	12	44	Size of family on farm (adult equivalent).....	4.0	3.8
Other crops.....	14	27	Real estate mortgage.....	\$237	\$157
Dairy products and cattle.....	528	737	Farm value per acre.....	\$194	\$287
Poultry and eggs.....	318	565			
Selling wood.....	17	15			

¹ Includes returns from outside labor.

² No data for 1915.

TABLE 14.—Number of farms of each type in 1915 and 1921.

Type of farming.	Number of farms of each type.	
	1915	1921
Dairy.....	34	29
Fruit.....	6	7
Poultry.....	5	5
Mixed.....	2	6

Twelve of the operators of these farms were following a different type of farming in 1921 from 1915, changing as follows:

Seven dairy farms changed to four mixed, two poultry, one fruit.

Three poultry farms changed to one mixed, one fruit, one dairy.

One mixed changed to dairy.

One fruit changed to poultry.

² There were several important changes in farm mortgages on these 47 farms during the six years.

The 11 farms having mortgages in 1915 averaged \$1,013 each; in 1921 only 7 farms had mortgages, averaging \$1,057 each.

Out of the 11 farms mortgaged in 1915, 7 paid off all of their mortgage (averaging \$878 per farm) by 1921; 3 reduced their mortgage an average of \$300 each during the six years; 1 acquired \$1,100 more than what he had; three farmers who had no farm mortgage in 1915 acquired an average of \$733 each by 1921.

Progress in the development of this group of farms was arrested somewhat for two reasons: (1) In 1915 most of these farms were going concerns, had passed the pioneer stage, and were sufficiently developed to provide a living for the family. The tendency is evident in many logged-off sections to stop increasing the size of the business as soon as the farm is large enough to require the full time of one man. The farmer's sons are then usually grown up and leaving for the cities or seeking farms of their own, and the operator is left alone with practically all of his time taken up with the chores. (2) The cost of clearing during this period was high. Many of the farmers expressed a desire to clear more land, but the price of explosives during the war period was more than they felt justified in paying.

Another probable reason for the apparent arrest in the progress of these farms is that three-fourths of the operators were over 45 years old in 1915. If a large proportion of these farms had been in the early pioneer stage in 1915, and the operators considerably younger, it is very probable that a cross section of the farm development and progress for the group would show a much greater change for the six-year period.

THE FINANCIAL PROGRESS OF SETTLERS.

While this study applies particularly to an area which has received great benefit in increased land values from the growth of large cities and towns, the general facts concerning the social and economic factors which surrounded the settlers, their financial progress, and the changes which took place during six years on a representative group of established farms should be significant to anyone interested in the settlement of the rapidly increasing cut-over areas in the heavily timbered regions of the Pacific Northwest.

The results of settlers' activities, their success and failures, and the many social and economic influences which affect the progress form one of the most interesting and important chapters in the development of a farming community.³

SOCIAL AND ECONOMIC INFLUENCES WHICH HAVE AFFECTED THE SUCCESS OF SETTLERS.

Several significant relations and tendencies are brought out by a study of Table 15. Some of the outstanding ones seem to be the proportion of settlers taking up wild land—that is, land which was entirely unimproved—has decreased steadily and there has been a similar decrease in the proportion of settlers of foreign birth; land values have increased greatly, and there has been a tendency for the size of the purchase to decrease; the recent settlers owned more capital at the time of taking up the land than did the earlier settlers, and there has been a tendency for recent settlers to assume larger mortgages with their purchases.

³ Unless otherwise specified, the term "settler," as used in this discussion, includes all those who took up land—whether improved or unimproved—for the primary purpose of making a living.

Social differences have a great deal to do with the settlement of a new agricultural region. Settlers coming from countries whose people are noted for their industry and frugality (Norway, Sweden, Finland, Denmark, Germany, and England) are generally successful in the development of a new agricultural region. (See Table 16.) The ones usually attracted to the land are those whose previous occupations and experiences have enabled them to save very little capital. They have also learned how to get along on very little. Coming onto these wild lands with not much more than a persistent deter-

TABLE 15.—*History of 166 settlers and financial status at time of settlement.*

	Time of settlement.				
	Before 1898.	1898-1903	1904-1909	1910-1915	1916-1921
Number of settlers.....	22	36	41	27	40
Per cent of settlers taking up wild land.....	86	64	63	41	20
Original net worth of settlers on—					
Wild land.....	\$475	\$1,381	\$1,725	\$1,981	\$2,200
Improved land.....	\$1,517	\$1,616	\$3,810	\$3,501	\$4,032
Average working capital at time of settlement.....	\$228	\$604	\$901	\$697	\$1,034
Mortgage at time of settlement, percent of real estate value.....	32.0	6.0	11.5	28.0	41.8
Average age of settler at time of settlement.....	31	36	41	42	45
Per cent of total settlers foreign born.....	91	83	80	70	38
Per cent of total settlers coming directly from States other than Washington.....	50	58	76	37	25
Per cent of total settlers coming directly from other occupations than farming.....	86	75	56	89	70
Status of farms taken up by these settlers:					
Acres in original purchase—					
Total.....	37.5	41.9	26.6	22.4	20.8
Cleared.....	.3	1.4	1.8	5.7	7.8
Real estate value per farm.....	\$639	\$917	\$1,794	\$3,036	\$4,483
Real estate value per acre.....	\$17.04	\$21.90	\$67.48	\$135.81	\$215.67
Buildings, value per acre.....	\$0.12	\$2.29	\$4.54	\$21.29	\$51.35

mination to succeed they have proved themselves to be one of the most important factors in the early development of the farming community. One advantage they have over other settlers is that they are more willing to adjust their standard of living to the conditions which they meet in passing through the pioneer stage.

TABLE 16.—*Nationality and former occupation of operators of 166 farms, 1921.*

Former occupation.	Native born.	Foreign-born.						Total.
		Norway.	Sweden.	Denmark.	Finland.	Germany.	All.	
Farmer.....	18	12	6	2	1	3	3	45
Laborer.....	1	14	7	2	3	4	2	33
Mill, shop, and factory.....	2	.....	2	2	.....	.....	3	9
City business.....	11	3	2	.....	.....	2	.....	18
Teacher.....	3	.....	.....	.....	.....	.....	.....	3
Carpenter.....	1	1	5	1	.....	1	1	10
Miner.....	2	3	2	.....	6	2	2	17
Painter.....	.....	2	.....	1	.....	.....	.....	3
Logger.....	2	2	.....	.....	3	.....	1	8
Fisherman.....	1	2	.....	1	1	.....	.....	4
All other.....	8	1	1	1	1	4	.....	16
Total.....	49	40	25	9	15	16	12	166

The changes in the value of logged-off land in this region have been an important factor in the rate of settlement by this class of people. Those with little capital are naturally eliminated by the high land values. It will be noted in Table 17, which is computed from actual

sales and purchases by the farmers interviewed, that the values of unimproved or wild land increased very little until the period 1904-1909. This period shows an increase of \$30 per acre, or approximately 170 per cent, over the previous period. The two following six-year periods show increases of \$43 and \$21, respectively, over the preceding period. It is therefore not surprising to find that a smaller proportion of settlers, particularly foreign born, are being attracted to the settlement of these lands.

This large increase in unimproved land values has not held true, however, for the greater portion of logged-off lands located in the more remote sections, where the growth of the cities and towns had little influence upon land values. In some of these sections land values have increased but slightly during the past 25 years. The land is held largely by timber and lumber companies who are disposing of it at from \$5 to \$25 per acre. Some of these lands are reasonably close to neighbors, schools, roads, towns, and railroads. People with very small means are particularly sought as settlers. Small first payments are accepted, and the companies generally fix the size of the following payments within the settler's ability to pay. One contemplating the purchase of wild land for farming purposes, however, should not be too easily influenced by the price until he has considered such factors as the quality of the land, availability of water supply, amount of land necessary to carry on the desired type of farming, proximity to market, the transportation facilities, and, as nearly as can be ascertained, the future development of the area. It too frequently happens that low-priced land is much more expensive in the end than higher-priced land.

TABLE 17.—*Average value of unimproved land at different periods as computed from 192 transfers.*

Period of sale.	Number of transfers.	Average price per acre.
Before 1898.....	50	\$15.35
1898-1903.....	40	18.02
1904-1909.....	57	48.64
1910-1915.....	21	91.71
1916-1920.....	24	112.81

Another significant tendency to be noted in studying Table 15 is that an increasing number of settlers are assuming large mortgages with their purchases. A larger proportion of the recent settlers are native Americans who have been attracted to the land from the ranks of the business and professional world. Many of them have had no previous experience in farming, but have pictured farming as a pleasant and profitable business enterprise, capable of paying off a mortgage in a very short time. The average mortgage per farm for the 40 farms settled between 1915 and 1921 was \$1,648, or 41.8 per cent of the purchase price. If more of these settlers had an intelligent conception of incomes to be expected from farming in this region before they decided to buy farms, they might escape much of the effort and misery incident to the paying off of large mortgages with small farm incomes.

Table 18 shows that the price which the settlers have accepted for their time and effort in preparing wild land for the plow is considerably less than it would have cost to clear the land at the market rate

for labor and materials. During the period 1916-1921 the contract cost of stumping alone ranged from \$200 to \$250 per acre. This does not include the slashing and the removal of small stumps and logs. When profits from farming are high, the demand for land ready for cultivation is comparatively great. This tends to raise the value of cleared land up to the market cost of clearing. The amount added to the value of land by clearing was comparatively low between 1910 and 1915, largely because the low demand for agricultural products reduced the bidding for cleared land.

TABLE 18.—*Changes in real estate values due to clearing as computed from 353 sales.*

Period of sales.	Number of sales.	Average number of acres per sale.	Value per acre.			Per cent of farm acres cleared.	Value of cleared land per acre.	Increased value per acre due to clearing.
			Real estate.	Buildings.	Land.			
Before 1898.....	54	36.5	\$15.96	\$0.08	\$15.88	0.3	\$189.33	\$173.98
1898-1903.....	59	35.1	23.13	1.28	21.85	2.6	164.80	146.78
1904-1909.....	89	21.1	66.50	6.29	60.21	7.4	234.34	155.70
1910-1915.....	58	20.3	140.26	19.94	120.32	21.2	227.48	135.77
1916-1921.....	93	15.6	221.93	44.30	177.63	34.2	302.32	189.51

ACCUMULATION OF WEALTH BY SETTLERS.

The amount of capital which the settlers in this region have accumulated is rather closely associated with the time of settlement. This is indicated in Tables 19 and 20, which show the increase in net worth of settlers from the date of settlement up to the fall of 1921. The oldest group of settlers have been on the land an average of 28 years and have increased their equity in the farm and working capital 18.7 times \$663 the average amount they had to begin with. In addition, many have invested part of their earnings in outside enter-

TABLE 19.—*Comparison of the financial progress and the accumulation of wealth by settlers at different periods.*

Time of settlement.	Before 1898.	1898-1903	1904-1909	1910-1915	1916-1921
Number of settlers.....	22	36	41	27	40
Number of years since settlement.....	28.0	19.4	14.3	7.9	2.6
Capital removed from farm: ¹					
Available in 1921.....	\$1,714	\$694	\$732	\$253	\$74
Spent prior to 1921.....	134	249	179	33	36
Sum of total capital removed from farm and the 1921 net worth as of farm (see Table 19).....	13,976	11,251	9,662	8,522	6,128
Outside capital invested in farm since starting ²	177	228	181	167	270
Outside earnings of family used on farm since starting ³	1,000	2,201	1,204	1,147	417
Total capital and earnings put into farm since starting ⁴	1,840	3,895	3,873	1,195	1,352
Net financial progress due to the settlers' farm activities and increase in land values ⁵	12,136	7,356	5,789	4,327	1,776
Total accumulation of wealth from all sources since starting ⁶	13,179	9,536	6,995	5,608	2,427
Accumulation of wealth per year since starting.....	471	492	489	710	933

¹ Includes all farm and family earnings which have not been reinvested in the farm business or spent for current farm and family expenses. Farm earnings as well as receipts from miscellaneous work off the farm are included. The amount of such capital saved by the family during their entire period on the farm is separated from the money which has been used up for doctor bills, education, traveling, etc.

² Includes all outside capital other than money earned by the operator and his family, as well as capital represented by gifts or inheritances.

³ Money which the family has earned off the farm and put into the farm business and home.

⁴ The sum of the original net worth of the settler (Table 19) and outside capital and earnings put into the farm since starting.

⁵ Differences between sum of capital removed from farm and 1921 net worth as of farm and the total capital and earnings put into the farm since starting.

⁶ The increase in net worth as of the farm plus capital removed from farm and available in 1921.

TABLE 20.—*Comparison of elements of net worth of settlers at different periods, 1911.*

Time of settlement.	Before 1898.	1898-1903	1904-1909	1910-1915	1916-1921
Number of settlers.....	22	36	41	27	40
Number of years since settlement.....	28.0	19.4	14.3	7.9	2.6
Real estate value, 1921.....	\$10,816	\$9,186	\$7,824	\$7,622	\$9,715
Working capital, 1921.....	1,362	1,217	1,183	1,501	991
Total capital as of the farm, 1921.....	12,178	10,403	9,007	9,123	7,706
Real estate mortgage, 1921.....	50	89	178	593	1,648
Other farm debts, 1921.....		6	78	294	40
Total indebtedness as of the farm, 1921.....	50	95	256	887	1,688
Net worth as of the farm, 1921.....	12,128	10,308	8,751	8,236	6,018
Original equity in the farm.....	435	862	1,587	2,185	2,611
Original working capital.....	228	604	901	696	1,054
Original worth, as of the farm.....	663	1,466	2,488	2,881	3,665
Gain in net worth as of the farm since starting.....	11,465	8,842	6,263	5,355	2,353

prises or put the money in banks for safe-keeping. When these are added to the increase in the farm equity and working capital, the earliest group of settlers have accumulated an average of \$13,179 in their 28 years on the land. This is probably considerably more than the average lifetime accumulation of wealth by city wage earners of similar ability and industry.

Eighty-six per cent of the settlers in the first group increased their net accumulation of wealth over \$6,000. (See Table 21.) Of those who settled during the succeeding periods, the following proportions accumulated more than \$6,000: Second period, 78 per cent; third period, 61 per cent; fourth period, 26 per cent. and the last, those who settled between 1915-1921, 5 per cent.

TABLE 21.—*Variation in accumulation of wealth by settlers at different periods.*

Wealth accumulated.	Number of settlers at specified times.				
	Before 1898.	1898-1903	1904-1909	1910-1915	1916-1921
\$18,000 and over.....	5	2	1		
\$15,000 to \$17,999.....	1			3	
\$12,000 to \$14,999.....	4	6	3	1	
\$9,000 to \$11,999.....	5	7	4	1	
\$6,000 to \$8,999.....	4	13	17	2	2
\$3,000 to \$5,999.....	3	8	11	9	11
\$0 to \$2,999.....			5	11	24
Wealth decreased.....					3

The settlers who have been on the land the longest show the greatest accumulation of money earned on the farm and not reinvested in the farm business. This includes money used for such investments as stocks, bonds, real estate, or money put into banks for safe-keeping; also money spent for such items as unusual trips, education, doctor bills, etc., which have taken considerable earnings from the farm. On the average, those who settled before 1898 accounted for \$1,848 in this manner. Many of the settlers stated that practically all of this was made during the last five or six years. Up until that time all earnings went toward the development of the farm and for running

expenses of the farm and family. Very few of the settlers have used outside capital, such as inheritances, gifts, or sale of other property, in the establishment and development of their farms.

A great part of the accumulation of wealth has been due to the increase in land values. Just how much of the wealth of individual settlers is due to this factor alone is difficult to ascertain. The trend of the increase in the value of unimproved land, as shown in Table 17, gives an indication of the importance of this item.

METHODS BY WHICH PROFITS MAY BE INCREASED.

Certain outstanding influences which contribute to the success or failure of farming in a region usually appear in the course of the analysis of the business of a group of representative farms. Some of these are general in character and have a wide application; others



FIG. 6.—This land has been pastured for several years. Logs have been cut into cordwood; ferns are beginning to crowd out the pasture grasses and the land should be cleared soon and put into tilled crops.

are of a more local consequence and apply specifically to the region studied. A brief discussion of the more important factors determining the success of representative farms of the different types in this region follows.

An increase in the tillable area per farm is necessary before incomes can be increased to the maximum on most of these upland farms. Too often the clearing has stopped soon after the farm is large enough to provide a living for the family. Under present conditions it is probably not worth while to clear up the whole farm, except perhaps in the case of small poultry and fruit farms on the high-priced lands adjacent to the larger cities. Most dairy and general farms can profitably use seeded stump lands for pasture purposes.

A 12-cow dairy farm in this section should have at least 25 acres cleared and 25 acres more for pasture if most of the hay and succulents are to be raised on the farm to maintain the cows, young stock, and horses. This was the average size of the 22 largest dairy farms in this area.

The poultry farms in this section should have land enough to maintain a cow for the family use and possibly a horse in addition to that needed by the flock. Seventeen of the largest poultry farms in this area, with an average of 1,000 laying hens, had 11 acres of land, 8 of which were cleared. This seems to be a very desirable size for a commercial poultry farm in this area. In order to insure poultry-yard sanitation, enough acreage is necessary to allow changing the runs at least every two or three years.

Fruit farms require a little more land than poultry farms. The 12 largest small-fruit farms in this section had an average area of 16 acres, with 9 cleared. From 5 to 10 acres seems to be the most practical size for a small-fruit farm where the owner attempts to do all of his work, except during the picking season.

Attention to soil management on these upland farms can not be too strongly emphasized. Deficiency of plant food and organic matter, together with insufficient moisture conditions, often results in complete crop failure on these lands. Frequent, shallow cultivation seems to be the most effective method of conserving the soil moisture, while green-manure crops (clover and grass, or rye and vetch) and animal manure are the cheapest means of increasing the organic matter of the soil.

Standardization of products is as necessary to the successful farmer as to the successful manufacturer. Not only will the standardization of farm products create a public confidence in what the farmer has to sell, but it will stabilize the demand for such products.

Standardization of grades of eggs as to color, quality, and size and the predominance of one breed of poultry (White Leghorns) have been largely responsible for the commercial recognition of the poultry industry in this section.

Since the fruit canneries furnish one of the principal markets for the small fruits in this section, varieties which are most desirable for canning should be chosen by those who intend to supply this market. For this purpose, the following varieties have been most successful: Marshal strawberries, Cuthbert raspberries, Evergreen blackberries Oregon Champion gooseberries.

Records of farm facts classified by enterprises are an important guide to management which farmers in this area, in common with most farmers everywhere neglect to their disadvantage. Farmers do not need to go into all the complexities of complete cost accounting, but they do seriously need simple records of the main factors of their business operations as a basis for making adjustments in the amount of land, labor, and materials applied to the several lines of production and for comparing these with the returns of the different lines at the same time and of the same lines at different times. Average results have been worked out and published for many different sets of working conditions and serve as guides in making the records and in comparing results. Special record books have been devised which materially reduce the clerical work a farmer needs to do in order to answer the questions he asks. A few minutes a day regularly applied will soon provide a wealth of definite information, the value of which can be realized only upon due trial. Records take most of the guesswork out of farming.

DAIRY FARMING.

Size of herds and production of the cows are important factors in returns from dairy farming in this as in other regions. Thirty-one of the 57 dairy farms studied had 8 cows or fewer. The small size of the farms rather definitely limits the size of the herds. Herds can not be materially increased without providing more feed, either from use of more land, or from heavier purchases, which amounts to the same thing. Something may be done in the way of improving pastures or pasture substitutes, but a large acreage is needed for even a small herd. The price of land is so high, however, as to preclude its use as pasture if it can be used for any other purpose. The dairy farms were for the most part established when land was much cheaper than it is now, which permits larger use of pasture than would be economical on farms recently purchased.

Much can be done in the way of increasing the production of milk, however, as the cows of half these 57 herds averaged less than 6,000 pounds of milk per year, while 8 herds averaged more than 7,500 pounds per cow. The differences are due partly to management and partly to the capacity of the cows, itself a phase of management. A cow producing less than 6,000 pounds in a year is probably a "boarder"—that is, she is probably not giving milk enough to pay for her feed and care—and should make way for a better producer.

The economical use of feed is highly important on these small farms where the crop yields are rather low, the land values high, and the purchase of all the grain feed practically necessary. The problem warrants very careful study on the part of each dairyman, especially in the matter of the observation of his own herd. Generally speaking, liberal feeding up to the point where the cows begin to get noticeably fat is economical feeding, because only half or less of the feed consumed is used for milk production. Heavy producers make more profitable use of the feed given them than do low producers. (See Table 22.) The dairyman should make every effort to provide his own legume hay, silage, or roots and pasture or pasture substitutes. Only under special conditions is it profitable to buy hay, though half the dairymen in this area bought some hay at an average price of \$25 per ton. The purchase of grain and mill by-products is advisable and practically a necessity, all but one of these dairymen buying mill feed.

The amount of mill feed needed per cow depends on the character and quantity of the roughage and pasture available and on the management. With plenty of legume hay of good quality and silage or roots, the use of high-protein feeds, which are the highest in price, may be greatly reduced. If cows freshen late in the winter and pasture is abundant throughout the summer, little mill feed need be supplied.

It is well to bear in mind that the price of milk is low in summer and that receipts are low, as well as expense for feed. Further, in order to secure high production, it is practically necessary to feed concentrates most of the time, and under these conditions fall freshening is likely to give the best results financially—the cows are in heavy milk flow when milk prices are high and have the stimulating effect of pasture to support the flow in the spring. Further, they suffer least from failing pastures in July and August. By buying

feed in ton lots or more at a time, some saving of expense may be effected, and it is usually possible for the discriminating dairyman to take advantage of differences in prices of feeds. Changes in the ration should be made on a basis of cost per pound of milk-producing ingredients rather than on cost per 100 pounds of feed. The two ideas are by no means the same.

Green feeds for summer use are regularly provided by the more successful dairymen, particularly on the small farms, to overcome the difficulty of short pastures in July and August. Oats with peas or vetch make good silage crops on these upland farms and are also well adapted to cut for green feed for the cows. Three or more seedings from the last of March to the first part of May should be made to insure a continuous supply of green feed during July and August. Unfortunately, corn does not do well on most of the upland farms, principally due to low soil fertility and moisture. The extra labor involved in a soiling system is considerable.

TABLE 22.—*Relation between pounds of milk per cow, receipts and cost of grain on 57 dairy farms, 1921.*

Pounds milk sold per cow.	Number herds.	Cows per herd.	Milk receipts per cow.	Grain purchased per cow.
Less than 4,500 pounds.....	7	8.0	\$77	\$23
4,501 to 5,500 pounds.....	13	8.1	96	29
5,501 to 6,500 pounds.....	18	8.7	113	32
6,501 to 7,500 pounds.....	11	11.5	132	35
Over 7,500 pounds.....	8	6.3	171	40
All farms.....	57	8.7	116	32

Cash crops of one kind or another may usually be fitted into the system of most dairy farms without seriously interfering with the most effective use of the land and labor devoted to the dairy enterprise. Small fruits are suitable for this purpose for those living near canneries and sources of labor for picking, while for those farther away, 2 or 3 acres of potatoes may serve about as well. The manure from the dairy is especially valuable in the production of intensive crops on the low-quality soils of the area.

POULTRY RAISING.

Breeding for production has reached a high state of development in this area. The area boasts of many of the highest producing hens and flocks in the country. (See figs. 7 and 8.) The average production of the 43 specialized poultry farms visited in the course of this survey was 134 eggs per hen. A comparatively high rate of production is necessary if the surplus eggs are to compete successfully in distant markets and overcome the disadvantages of transportation and other costs.

Poultry raising is more susceptible of overexpansion than any other type of farming. It can be started easily with relatively small capital on small places and is a rather attractive business. It needs, however, careful study of details at every stage if it is to prove as profitable on a large scale as it may seem to be on a small scale. The Western Washington Experiment Station at Puyallup has been the leading light in successful commercial poultry production through-



FIG. 7.—One of the successful commercial poultry farms in this section. Starting with 815 hens in the fall of 1920, the flock averaged 142 eggs per hen through the following 12 months. The farmer also kept 5 cows; raised a cash crop of 1.5 acres of potatoes, besides 1 acre of kale for the chickens and most of the hay for the cows.



FIG. 8.—One of the more expensively equipped poultry farms. Breeding stock, hatching eggs, day-old chicks as well as market eggs are sold.

out western Washington. No one should attempt to engage in the poultry business in this area without first visiting the station at Puyallup and becoming acquainted with the methods there developed and getting the benefit of the experience of the people who more than all others are responsible for the development of the many successful poultry farms in that section of the country.

The increase in income per hen as production increases is indicated in Table 23. The small flocks do not show generally higher production than the large flocks. The expense connected with higher production rates increases, but not as fast as the receipts per hen, much as in the case of feed for dairy cows. (See Table 23.) The average cost of feed for laying hens was about \$2 per hen in 1921.

Feed represents nearly three-fourths of all expense on these poultry farms. Wholesale purchases, home mixing, and scientific rations and feeding practices are the means of saving considerable sums in the feed expense. Green feed is important and should be more generally provided than it is. One acre of kale will usually supply enough for 800 to 1,000 laying hens. (See fig. 9.) Oat sprouts are also good and the means for sprouting them should be a part of the poultry equipment.

TABLE 23.—*Relation between number of eggs sold per hen and receipts per hen on 43 poultry farms.*

Eggs sold per hen.	Number of flocks.	Hens in flock. ¹	Egg receipts per hen.
115 and less.....	7	599	\$3.19
116 to 135.....	14	813	3.84
136 to 155.....	15	667	4.18
Over 155.....	7	627	4.82
All flocks.....	43	697	4.00

¹ At beginning of year (Oct. 1, 1920).

Yard sanitation is essential to continuous success, because of the intestinal parasites which infest the soil in old runs, especially in damp and shady places. If the yards can not be changed, it is better practice to keep the fowls confined to the houses where sanitary conditions may be controlled.

Many poultrymen take advantage of the opportunity of securing stock from high-producing flocks by purchasing day-old chicks from breeders and avoid the necessity of maintaining breeding flocks and the work of keeping up the production of the breeding stock. Nearly half bought all their young stock. The average price of day-old chicks was 19 cents in 1921. The feed cost of raising pullets ranged from \$0.80 to \$1.20 each. Ten of the farms visited produced one salable chick for every two eggs used. Forty and six-tenths per cent of the day-old chicks bought by 18 poultrymen were brought through as mature pullets. Four to five eggs were therefore used for every pullet put into the laying houses in the fall.

The average number of hens per flock was 697 at the beginning of the poultry year, October 1. Twenty farms, however, had fewer than 500, and of these only four paid interest on their investment. Half of the farms with more than 500 hens made interest on the investment. A flock of 500 hens is not large enough to occupy the full time of one man if they are properly handled, and some other means



FIG. 9.—Kale is an important green feed on many poultry farms. One acre of kale will provide succulence for 800 to 1,000 hens from early fall till late spring. Moist, fertile soil is necessary to produce good crops of kale.

of adding to income is necessary. Increasing the size of the flock is perhaps the best means of increasing income if the management of the smaller flock has been successful. It is also possible in many cases to take on a few acres of bearing small fruit, a unit of up to 1,000 hens and 2 to 3 acres of small fruit being within the working limits for a man and his wife except for the picking season.

SMALL-FRUIT GROWING.

Adaptability to soil conditions is becoming an increasingly important factor in successful small-fruit growing in western Washington. The best results are obtainable only when each kind is grown on the kind of soil on which it has the best chance to succeed. Strawberries prefer the well-drained sand and gravelly loams common to this area, though they grow on many kinds of soils. (See fig. 10.) In the lower and moist areas there is more danger of the bloom freezing, and the plants run largely to foliage. Raspberries thrive best on the sandy and well-drained clay loams which do not dry out early in the season. Logan blackberries thrive on land suited for raspberries, but do better on clay loams and will stand considerably more soil moisture. Evergreen blackberries have a wide adaptability, but prefer a rich clay loam soil which is retentive of moisture.

Diversification of smallfruits is often a safeguard to profits on farms which depend entirely upon berries for an income. The failure of one crop due to disease, weather, and other causes does not then leave the grower a total financial loss for the year, as has happened

occasionally to strawberry and other small-fruit growers who have had to depend entirely upon a single crop. Two or more small-fruit crops also permit the operator to distribute his labor more evenly through the season. Just how many acres of each variety of fruit to grow would depend a great deal upon soil and other conditions.



FIG. 10.—One of the successful berry farms. The 2 acres of bearing strawberries on this farm averaged 500 crates of 24 pints each, per acre. Three acres of raspberries and 1 acre of strawberries were planted during 1921.

Combining fruit growing with poultry raising or dairying is increasing the profits of many of the fruit farms in this area. To show the effect of such combinations on the farm income, the 24 small-fruit farms were sorted into groups, large farms and small farms, each of these being further sorted according to the amount of livestock kept. The average farm income of the small farms with little livestock was \$253, and of those with the most livestock, \$437. It was \$512 with the least livestock and \$1,132 for the large farms with the most livestock.

The combination of fruit and livestock has another advantage in that it provides for fertilizers, which are necessary for maximum crop yields on these soils.

MIXED FARMING.

By definition farms of the type styled "mixed" have several enterprises, often five or six, none of which predominates, and usually no one of them is large enough to be of commercial importance. They are usually less profitable than the more specialized farms of the types prevailing locally. One of the first steps in the reorganization of such farms should be a study of several enterprises individually to determine which of them can be developed to the best advantage. Use of land and of labor and the relative returns of each should be observed carefully until a decision can be made, perhaps for one season, though more time may be needed. A record of the observa-

tions will indicate the amount of change needed to secure the desired result. The operators of the "mixed" farms did more outside work than the other farmers, though they had the second highest capitalization and second largest farms.

During the pioneer stage it is often necessary to supplement income from the home farm with outside work. The employer expects to make a profit from this outside work, which the farmer working out may turn into his own pocket by working for himself as soon as he can lay out his business to occupy his full time. This general proposition is abundantly supported by the comparative results of farm operations where the farmer works out and when he spends all his time on his own business.

PROBLEMS INVOLVED IN CHOOSING AND DEVELOPING A FARM.

Thousands of people, not only in the Pacific Northwest but in all other cut-over areas, have given years of the hardest kind of toil trying to clear and cultivate land which should never have been used for agricultural purposes. Such misdirected human effort is not only an irreparable loss to the individual, but a serious loss to the State and the Nation as well. Prospective settlers need protection and guidance in the selection of a piece of land for a farm. All guess-work possible should be eliminated. Too much is at stake to tolerate "a guess" when anyone has definite information about the farm.

MAKING THE RIGHT CHOICE.

It is not so difficult to name the factors which have induced most people to settle these wild lands—independence of a boss, the desire to live in the country, wanting to live on a farm, or, perhaps, improve the health of some member of the family. All of these are common reasons, but in most cases the primary inducement has been the hope of bettering themselves financially. Not being able to save money by following their previous occupations, they are turning to the land. Filled with this desire to own a piece of land, the settler usually comes in contact with some agency which is very desirous of selling him the land, or he may be unduly influenced to settle in a certain section purely for such personal reason as to be near relatives or certain groups of people. In other words, the prospective settler often loses sight of two of the principal factors which later are to determine the results of his farming activities, namely, the price and quality of the land he buys and the future possibilities of the area.

Before a prospective settler decides to locate in a particular area he should take plenty of time to familiarize himself with the comparative prices and agricultural worth of lands in various localities. The State immigration commission, agricultural college, experiment station, and county agents can often render valuable help in this matter. Government soil-survey reports, similar to the one published for soils of the eastern Puget Sound Basin, are also an aid to the new settler in determining the region in which he shall locate.

The type of farming which a settler wishes to follow may go a long way in deciding the particular area in which he should farm or the price which he can afford to pay for land. Poultry and fruit farming can stand a higher rent for use of land than dairying, because a larger business can be done on a smaller acreage. Poultry and small fruits.

particularly strawberries, currants, and gooseberries have a better chance on the lighter and drier soils than dairy farming, which depends for success largely on an abundance of cheap forage crops and pasture. If the settler wishes to engage in poultry and fruit farming the areas nearer the larger cities offer many advantages in market and transportation facilities and a ready supply of extra labor. With the gradual expansion of facilities and the settlement of practically all of the good unimproved land adjacent to the large cities, the new poultry raiser can well afford to consider the possibility of locating on land which at present is beyond the influence of town-lot prices. The prospective dairy farmer who wishes to succeed on a logged-off farm must necessarily look for cheap land which is capable of producing good field crops and an abundance of pasture.

The availability of a good water supply for all farm needs is of prime importance in the selection of a farm in this region. On many upland farms this has often been the limiting factor in the success or failure. Unfortunately, there are no accurate methods of ascertaining the depth to which one must go to get an adequate supply of water. The presence of a considerable amount of moisture-loving vegetation is often a fair indication that water is available within a reasonable depth.

Buying wild land and clearing it, if all costs are included, will in most cases amount to more than the land is finally worth, even though the rise in land values during the past few years has tended to cover up this fact. This is particularly true in the vicinity of the large cities. In view of the high cost of clearing, only the best lands should be selected for agricultural purposes. A settler who pays too much in labor, time, and money for a good farm is at a disadvantage, but not an insurmountable one, as would be the case if he selected a poorer type of soil.

FINANCING OPERATIONS.

The amount of money which a settler needs to begin farming on the logged-off uplands in this region is largely dependent upon such factors as the price and quality of the wild land, the extent of improvements if an unimproved farm, the possibility of obtaining outside employment while paying for and developing the farm, and the standard of living to which the settler has been accustomed before he settled the land.

The settlers who came into this section before 1898, those who took up wild land particularly, had a comparatively small amount of money when they decided to settle. The average net worth of the settlers on unimproved land was then \$475, while those who bought improved farms had accumulated an average of \$1,517 before they began to live on the place. (See Table 15.) By 1916-1921 the amount necessary to begin with had not only increased to \$2,200 for the settlers on unimproved farms and \$4,032 for those who bought improved farms, but the size of the purchase has been reduced almost half. The high price of land which is useful for agricultural purposes near the large cities makes it necessary for a new purchaser to buy a smaller farm and put it to its maximum usefulness if he expects to realize returns with which to pay off his debts. As has been shown, poultry and fruit seem to serve this purpose best. If one wishes to

settle farther from the cities, 25 to 50 miles, better land is still obtainable and at a much lower cost, but social, market, and transportation facilities should be carefully considered.

Whether one should buy improved or unimproved land is not always easily determined. A prospective settler with sufficient capital would in all probability progress more rapidly and at a smaller cost of time, labor, and money if he bought an improved farm. The results of the study show that he would be buying the product of the former owners's efforts in improvements at less than the market value.

If the prospective settler is young, ambitious, and intelligent he will probably advance more rapidly if he buys improved land, even though he must go considerably in debt for it. Considerable caution, however, should be exercised on this point. It was very apparent that a large majority of those who bought improved farms in this section on a small first payment, expecting to pay for the farm from farm profits, were induced to do so through false ideas. They were not familiar with farming conditions in this section and had very little knowledge of farm incomes. The business analysis of farms in this region, which has already been discussed, will give the prospective settler a better idea of what he can reasonably expect from the farm in paying off a mortgage.

Many settlers on these logged-off farms have been able to help pay for the farm, or increase their incomes, by means of outside work, such as county road work, teaming, cutting and selling cordwood, teaching, working in the logging camps, and clerking in the near-by cities. Too much reliance, however, should not be placed upon this means of paying for the farm, as the amount of work available has seldom been sufficient to meet the demand. Table 24 shows the comparative incomes on farms where the operator did outside work and where very little work was done off the farm. None of the fruit farms received an appreciable amount of help from outside receipts. Receipts from the day-old chick business were considered the same as an outside receipt and are an important item in the high incomes of the poultry farms. Poultry raising seems to fit in better with outside work than any of the other types.

Several cases were noted where the operator was able to help his wife with most of the poultry chores during the mornings and evenings and teach, clerk in the city, or do some other outside work during the day.

TABLE 24.—*Comparison of incomes on farms where the operators did and did not do outside work, 1921.*

	Dairy.		Poultry.		Mixed.	
	Outside work.	No outside work.	Outside work. ¹	No outside work.	Outside work.	No outside work.
Number of farms.....	13	44	10	33	11	12
Average farm income.....	\$451	\$162	\$1,517	\$356	\$336	\$278
Farm family income.....	\$577	\$325	\$1,899	\$524	\$534	\$361

¹ Includes day-old chick business.

The standard of living to which the prospective settler has been accustomed has much to do with the amount of money he will need to establish himself on the logged-off lands in this region. During the first few years, when the farm income on newly opened land is almost nothing, the cost of maintaining the previous standard of living must be met largely out of capital or outside earnings. Those accustomed to frugal living do not suffer so keenly from the privations incident to the restricted incomes obtainable during the first years of developing farms from raw land.

OPENING AND DEVELOPING THE FARM.

The main business of the settler when he takes up a piece of land to farm is to get the land to produce returns in the quickest and most economical manner. As the cost of clearing in this region is higher than in other cut-over sections of the country and may exceed the value of the land after it is cleared, the importance of economical methods in opening these wild lands is obvious.

The first task of the new settler is usually providing a place to live. Since most settlers have very little capital left after making the first payment on the land, the building program should be one of low initial cost and with due regard for economy of construction and durability. Often the dwelling can be planned with the idea of later turning it into a poultry house or granary or of using it as a part of the dwelling which is to be built later. Precautions against fire should be taken by removing to a safe distance all brush and other inflammable material. Any trees or snags which might endanger the buildings should be cut down.

Producing as large a part as possible of the family living from the farm should be one of the first aims of the new settler. Land enough for a large family garden can usually be cleared between the large stumps the first year. Fertilizers, frequent cultivation, and watering must usually be resorted to, as these upland soils are not as a rule very satisfactory for crops until they have been worked up and exposed to the weather for a year. A cow and some chickens for family use should be among the first things purchased.

A considerable portion of the logged-off land should be slashed as soon as possible, burned, and seeded to pasture. This is the first step in the clearing process. This will provide pasture for the stock and add fertility to the soil. Many of the small stumps will begin to decay, which considerably reduces the cost of clearing.

Poultry and such crops as strawberries and potatoes seem to be the quickest means of getting returns from new lands. Chickens nearly always do remarkably well on new land, and very little clearing is necessary for a flock of commercial importance. Strawberries prove a very desirable cash crop on newly cleared land adapted to their growth. Early potatoes have also been successful. However, if cash returns from crops are not immediately necessary, the most desirable method of handling the new land seems to be to seed it to clover and grasses, with oats as a nurse crop. After the land has been in hay (clover and grasses) for two or three years it is ready to be plowed and used for cultivated crops. By this time the ferns, which are a considerable pest in pastures and new clearings in this region, have been largely controlled.

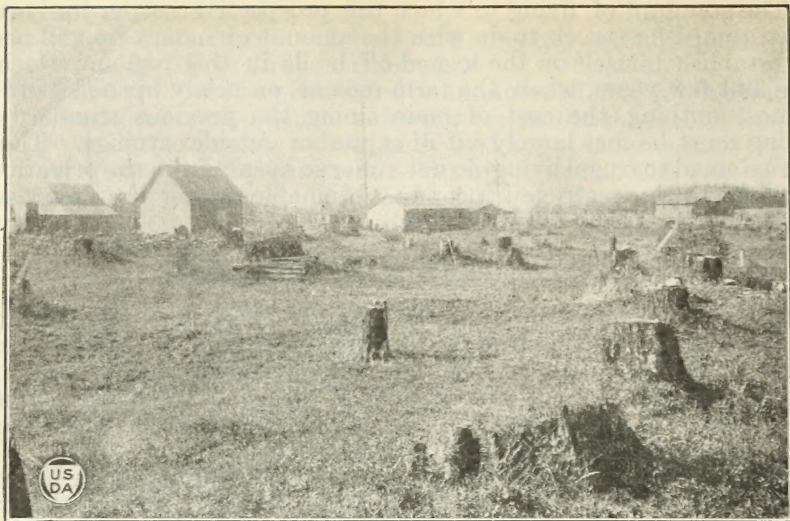


FIG. 11.—A recently established farm on logged-off land. After logs and small stumps have been removed, partial tillage is possible and good crops of hay can be grown for 2 or 3 years. Many of the best settlers have followed this practice.

Providing for sufficient home-grown feeds for the stock is very important on most of the new logged-off farms. The most desirable procedure for the settler with no cleared land seems to be to clean up the small stumps, trash, and most of the logs, then stir the soil as much as possible with a spring-tooth harrow or disk and seed to clover and grasses. If this is done in the fall no nurse crop will be necessary and a good crop of hay can be expected the following summer, particularly if the soil has sufficient moisture. If the seeding is done in the spring, the use of a nurse crop will give better results.

When the settler is ready to attack the large stumps, several methods are open to him. His choice will often depend on the amount of time and money which he has available for this work. In most cases the quickest and cheapest way to get rid of the large stumps is by means of powder and block and line. This method has already been discussed in the chapter on land clearing.

Developing a farm from logged-off lands in this region or in any other region is a very tedious process, even under the most favorable conditions. The hardships and privations which frequently crowd the early years of the pioneer can be appreciated only by those who have paid the price. The vital importance of selecting a good piece of land at a fair price in a region which has possibilities for future development can not be overemphasized. Strict application to the farm business, adjusting the standard of living to the farm income, and keeping alive to the best sources of farm information for his particular area will make a success out of any farmer, provided he made a good choice in the selection of his land.

